HASTY SURVEY TECHNIQUES-GRAPHIC RESECTION

Description

Graphic resection is a method of determining position based on the known locations of certain visible points. The equipment needed to perform a graphic resection includes an M2 aiming circle, a map sheet, overlay paper or acetate, and a straightedge.

Procedures

Select a location from which three distant points, which appear on the map, are visible. These points are well-defined vertical features, such as towers, trig markers, or church steeples.

Measure the three clockwise angles between these points with the aiming circle: first point to second point, second to third, and third point back around to the first, completing a circle around the horizon. For each angle, measure to the nearest 0.5 mil as follows:

- Set up and level the aiming circle over the proposed SCP.

- With the upper motion, set 0.0 mils on the aiming circle.

- With the lower motion, sight on the first known point.

- With the upper motion, measure the angle to the second point, and record this first reading to the nearest 0.5 mil.

- With this reading on the scales, sight again on the first point by using the lower motion.

- With the upper motion, again measure the angle to the second point. Record the second reading on the upper motion to the nearest 0.5 mil.

- Divide the second reading by 2 to determine the mean angle, which must agree with the first reading to the nearest 0.5 mil. If the first reading is more than 3,200 mils, you must add 6,400 mils to the second reading before dividing by 2. If the two readings do not agree within 0.5 mil, return to the first step.

Add the mean angles from between each point to ensure that the total sum of all three is equal to 6,400 mils ± 1.5 mil. Determine the eight-digit grid locations of the three known points from the map or a trig list, and write these beside the points.

Using the overlay paper or acetate, draw a central point, which will represent the location of the aiming circle. Using a straightedge, draw a line (first ray) outward. Using a range-deflection protractor (RDP) or a coordinate scale (less accurate), measure clockwise the number of mils corresponding to the angle between the first and second known points. Draw a line along that mil measurement from the central point outward (second ray). Do this again with the third angle, developing a third ray from the central point outward. With the third ray in place, measure from it, clockwise back to the first ray. Compare this measurement to the mean angle from the aiming circle. These two angles should agree to within ±0.5 mil.

Place the overlay with the three lines radiating out from the central point on the map sheet. Position it so that the first ray passes through the frost known point from the map, the second through the second point, and likewise for the third. Once all three are aligned, the central point from the overlay paper represents the aiming circle map location.

Use a coordinate scale to determine the eight-digit grid of the aiming circle and the approximate elevation. Record these data for the launcher to use in updating its PDS after every 4 to 6 kilometers of travel and should not use it for calibration.